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African American Children's Depressive Symptoms: The Prospective Effects of Neighborhood Disorder, Stressful Life Events, and Parenting

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Keywords

Depressive symptoms, Neighborhoods, Stressful life events, Family

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Abstract

The prospective effects of observed neighborhood disorder, stressful life events, and parents' engagement in inductive reasoning on adolescents' depressive symptoms were examined using data collected from 777 African American families. Multilevel analyses revealed that stressful life events experienced at age 11 predicted depressive symptoms at age 13. Furthermore, a significant interaction between neighborhood disorder and parents' engagement in inductive reasoning was found, indicating that parental use of inductive reasoning was a protective factor for depressive symptoms particularly for youths living in highly disordered neighborhoods. The importance of examining correlates of depressive symptoms from a contextual framework, focusing on individuals, families, and neighborhood contexts, is emphasized.

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Introduction

Transitional periods are opportune times to observe changes. The transition to adolescence has often been seen as a time of profound social and psychological changes because children

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of this age begin, for the first time, facing a more complex social environment, a widening array of social stressors, and dramatic physiological changes of puberty. Emotional changes are often evident during this transitional period. Several longitudinal studies have shown that youths, especially girls, experience a significant increase in depressive symptoms during the transition to adolescence (Ge, Lorenz, Conger, Elder, & Simons, 1994; Hankin et al., 1998; Wichstrom, 1999). What is less clear, however, is what contextual factors actually account for such emotional changes during this transitional period. In this report, we consider the prospective roles of neighborhood disorder, stressful life events, and parenting on depressive symptoms during early adolescence by using a longitudinal data from a large sample of African American children and their families.

Neighborhoods and adolescent depressive symptoms

Neighborhood conditions appear to be associated with individuals' mental health. Among a number of theoretical models for neighborhood effects on emotional and behavioral problems (Jencks & Mayer, 1990; Leventhal & Brooks-Gunn, 2000; Sampson, Raudenbusch, & Earls, 1997; Wandersman & Nation, 1998), the most relevant to this study involves the neighborhood disorder model (Ross, 2000). Neighborhood disorder refers to conditions and activities in a neighborhood that are perceived as social and physical disorder (Ross, 2000). Whereas social disorder includes activities such as public drinking, gangs, harassment, drug dealing, and prostitution on the street, physical disorder involves physical markers such as dilapidated buildings, observable signs of littering, vandalism, and graffiti. These social and physical incivilities affect behavioral and psychological well-being of residents because such incivilities challenge widely held beliefs of what socially and publicly appropriate behaviors are and indicate a breakdown of informal social control (Skogan, 1990). Under the neighborhood disorder model, neighborhood disorder is expected to affect residents' emotion negatively because it introduces a sense of powerlessness, increases despair, and imparts fear and distress (Ross, 2000; Ross, Mirowsky, & Pribesh, 2001). Residing in a highly disordered neighborhood is also stigmatizing (Sampson & Raudenbush, 2004), making residents feel alienated.

Several cross-sectional studies have revealed significant effects of neighborhood disorder on depressive symptoms for adults and adolescents (Anshensel & Sucoff, 1996; Cutrona, Russell, Hessling, Brown, & Murry, 2000; Ross, 2000), although some studies reported no such evidence (e.g., Boardman & Saint Onge, 2005). For example, using a probability sample of over 2,400 adults, Ross (2000) reported that neighborhood economic disadvantage, as indexed by a high percentage of mother-only households below the poverty line, was related to depression. Importantly, the distressing effect of neighborhood economic disadvantage on depression was further mediated by neighborhood disorder. According to Ross (2000), neighborhood poverty increases physical and social disorders in a neighborhood, which in turn affects residents' levels of depression. Similarly, Cutrona et al. (2000) found that African American adults who lived in neighborhoods high on social disorder tended to have more depressive symptoms and other adjustment problems than those living in more affluent neighborhoods. Similar neighborhood effects were reported by studies with adolescents. For example, Aneshensel and Sucoff (1996) found that perception of ambient hazards (e.g., graffiti, crime, or drug use) was related to adolescent depression. Examining the influence of neighborhoods is especially important for children at the transition to adolescence because of their increased involvement with the larger social world outside their home (Duncan & Raudenbush, 1999; Roosa, Jones, Tein, & Cree, 2003).

Relatively little is known about the prospective contribution of neighborhood disorder to the development of depressive symptoms, with an exception of two studies. In one study, Latkin and Curry (2003) reported that residents' perceptions of neighborhood characteristics were

predictive of depressive symptoms nine months later. In another study, Cutrona et al. (2005) found that new cases of depression, 2 years later, were predicted by the combination of severe life events and residence in neighborhoods high on economic disadvantage and social disorder. These findings suggest that neighborhood circumstances not only affect depressive symptoms concurrently but also exert influences on subsequent depressive symptoms prospectively. However, both studies focused on adult samples. We know little about how neighborhood disorder is prospectively linked to adolescents' depressive symptoms. In the present study, we tested a hypothesis that neighborhood disorder observed when the study participants were at age 11 would be prospectively associated with depressive symptoms at age 13, even after controlling for their initial levels of depressive symptoms at age 11.

A common limitation in studies on neighborhood disorder and depressive symptoms involves the possibility that depression may alter perceptions of neighborhoods. That is, depressed respondents tend to focus on negative characteristics of neighborhoods (Watkins, Martin, & Stern, 2000). This issue becomes especially salient for cross-sectional studies when neighborhood disorder and depression are measured contemporaneously. Even short-term longitudinal studies are not completely immune to this limitation because reports of neighborhood condition at earlier points in time may not be free of biased perceptions colored by earlier depression. A potential way to circumvent this problem is to use different informants to independently report depressive symptoms and neighborhood disorder. Another way is to lengthen the time interval between two assessments, if enough time elapsed for depression to remit. In this study, we used youth reports of depressive symptoms and interviewer reports of neighborhood conditions. In addition, data collection in the current study was based on a two-year interval between two assessments.

Stressful life events and parenting

Stressful life events have been identified as an important risk factor for increases in depressive symptoms (Aneshensel, 1992; Brown & Harris, 1978). Several studies have shown that an increase in stressful life events parallels the upward surge of depressive symptoms in adolescence (Ge, Lorenz, et al., 1994; Larson & Ham, 1993). Early adolescence, in particular, has been shown to be a period of elevated vulnerability to stressful life events, compared to middle or late adolescence (Siegel & Brown, 1988), especially among girls (Ge, Lorenz, et al., 1994). Stressful life events have been shown not only to have a significant concurrent relationship with depressive symptoms, but also to be prospectively predictive of depressive symptoms (e.g., Compas, Howell, Phares, Williams, & Guinta, 1989). In a longitudinal study of mid-adolescents, Windle (1992) found main effects of stressful life events at an earlier point in time on subsequent youths' depressive symptoms, after adjusting for their initial level of emotional distress. This prospective stressful life events-depressive symptoms relation was especially pronounced among girls.

Additional supports for the prospective effect of stressful life events come from the stress-sensitization model. This model posits that exposure to stress may reset the tolerance level for future stressors at a lower threshold, making it more difficult for individuals to cope with subsequent stress later in life (Hammen, Henry, & Daley, 2000; Hammen, Mayol, deMayo, & Marks, 1986; Post, 1992). In such instances, even a moderate amount of stress could bring about another episode of depression. Thus, stressful life events children experienced in early adolescence are likely to be related to later depressive symptoms. We hypothesized that stressful life events experienced in early adolescence (i.e., at age of 11) would predict depressive symptoms two years later (i.e., at age of 13).

Considerable evidence has accumulated to suggest that an authoritative, involved, and nurturing parenting behavior confers benefits to child development (Baumrind, 1991;

Steinberg, Mounts, Lamborn, & Dornbusch, 1991). Parenting behavior has been linked to adolescents' depressive symptoms both concurrently (Ge, Conger, Lorenz, & Simons, 1994) and prospectively (Ge, Best, Conger, & Simons, 1996). For instance, Ge, Best et al. (1996) reported that, compared to children whose parents were warm in early adolescence, children whose parents were harsh and hostile when children were 7th, 8th, and 9th graders were more likely to have elevated depressive symptoms in 10th grade. Therefore, examining parenting behavior as an antecedent of depressive symptoms may be especially important.

One of the prominent forms of discipline that has been linked to child development is parents' engagement in inductive reasoning (Hart, DeWolf, Wozniak, & Burts, 1992). Inductive reasoning can be viewed as one dimension of nurturant parenting, which includes parental actions such as clarifying parents' expectations, identifying problems and possible consequences, supplying explanations, and providing rationales by eliciting ideas from children rather than disciplining them in a coercive manner. Parental engagement in inductive reasoning may be particularly important for adolescents whose cognitive maturity allows them to logically follow and understand parents' explanations. We were particularly interested in examining the effect of parents' engagement in inductive reasoning on adolescents' depressive symptoms for the following reasons. First, parents' lack of inductive reasoning and reasoned explanation may aggravate an adolescent's sense of uncertainty and frustration, which are important components of depressive symptoms (Kim & Ge, 2000). Furthermore, parents' engagement in behaviors such as explaining and seeking children's opinion may foster children's sense of self-worth because such parental behavior sends a message to children about parental acceptance of children's autonomy, an important developmental task for growing adolescents. Second, inductive reasoning is a particularly important disciplinary practice among African American parents. Bluestone and Tamis-LeMonda (1999), who examined parenting practices among working- and middle-class African American mothers, revealed that reasoning was the most commonly reported disciplinary strategy. However, we only have scant knowledge of how this commonly used parenting strategy in African American families influences adolescents' emotional development. Finally, identifying a specific form of parenting practice, such as inductive reasoning, as a protective factor helps inform future design of preventive interventions. Compared to an abstract concept such as supportive parenting, inductive reasoning is relatively concrete and teachable. It also can be readily incorporated into interventions. Based on the above reasoning, we expected that higher levels of parents' engagement in inductive reasoning would be significantly associated with lower levels of adolescents' depressive symptoms two years later.

A moderating role of neighborhood disorder

In addition to its main effect, this study also considered the role of neighborhood disorder in moderating the effects of stressful life events and parenting. We examined neighborhood disorder as a moderator because stressful life events and parenting do not occur in a vacuum but are embedded in neighborhood contexts. Thus, the effects of stressful life events and parenting are likely to depend on neighborhood contexts, either being reduced or amplified by the conditions of neighborhood disorder (Gore & Eckenrode, 1996).

Specifically, we predicted that neighborhood disorder would amplify the negative effects of stressful life events on adolescents' subsequent depressive symptoms such that adolescents would show increased levels of depressive symptoms at age 13 if they had lived in highly disordered neighborhoods with frequent exposure to stressful life experiences at the age of 11. This hypothesis is consistent with the cumulative risk model (Garmezy, 1987, Quinton & Rutter, 1976; Rutter, 1979; Seifer, Sameroff, Baldwin, & Baldwin, 1992) where experiencing multiple stressors compounds the likelihood of psychopathology. According to

this model, living in a disordered neighborhood and experiencing a larger number of stressful events should be most detrimental for youths' emotional well-being. Following this line of reasoning, we expected a significant statistical interaction between neighborhood disorder and stressful life events on depressive symptoms.

There is also some emerging evidence that neighborhoods moderate the effects of supportive parenting. Dearing (2004), for example, recently reported that the positive effects of supportive parenting practices are especially pronounced among children living in highly disordered neighborhoods. Similarly, Forehand and Jones (2003) found that low levels of parental conflict protected African-American girls from developing depressive symptoms especially when girls lived in a violence-laden neighborhood. Parents' engagement in inductive reasoning is also likely to be beneficial particularly for youths living in highly disordered neighborhoods. Residents living in highly disordered neighborhoods often perceive their lives to be out of their control (Ross et al., 2001). Parental behaviors, such as providing explanations and inducing children's ability to think, would nurture children's skill to evaluate the situation, which may help restore a sense of control and overcome feeling of powerlessness and uncertainty. Based on these findings and reasoning, we expected that parents' engagement in inductive reasoning would demonstrate a buffering effect such that having a parent who provides reasoned explanations of their disciplinary actions to children would protect children from developing depressive symptoms, particularly when a family lives in a highly disordered neighborhood.

In previous studies of externalizing problems using the Family and Community Health Study (FACHS), Brody et al. (2001) have demonstrated significant interaction effects between parenting and neighborhood conditions. The present study replicated and extended Brody et al. (2001) in several aspects. First, the present study used two-wave longitudinal data to examine a prospective effect of the interaction between neighborhood disorder and parenting on subsequent adolescent depressive symptoms, whereas Brody et al. (2001) only used the first wave of this longitudinal sample to examine affiliation with deviant peers. Second, this study extended the study by Brody et al. (2001) by using interviewers' rating of neighborhoods. Third, whereas Brody et al. examined a broader construct of parenting, the current investigation focused on a specific parenting behavior, i.e., inductive reasoning.

Studying African American children

The current investigation of neighborhood effects is particularly relevant to our understanding of the development of African American children and adolescents. Although African Americans have a wide range of neighborhood experiences, a substantially higher proportion of African American than European American children lives in disordered neighborhoods (McLoyd, 1990, 1998). With fewer economic resources and employment opportunities but more stressors, the life experiences of poor African American children are markedly different from those of European-American middle-class children. As McLoyd (1990) has pointed out, findings of previous studies that have investigated European American families may not necessarily be generalized to African American individuals. Examining directly how neighborhood circumstances are associated with lives of African American children, therefore, is urgently needed. This study focused exclusively on this under-studied population.

Another important feature of the present study involves the fact that this sample of African American children comes from rural and suburban neighborhoods (see Brody et al., 2001 for a more detailed description of the sample). The majority of previous neighborhood research on African American children has been based on inner-city samples, largely because a significant proportion of African American children live in inner cities. However, African

American children grow up in diverse communities with varying levels of neighborhood disorder. The present study, therefore, was designed to contribute to our knowledge base on African American children living in neighborhoods other than inner cities.

Methods

The Family and Community Health Study

The present study is based on the first two waves of data from African American children and their families who participated in the Family and Community Health Study (FACHS). The FACHS is an on-going multi-site longitudinal study of the impact of neighborhoods and families on the health and development of African Americans. The FACHS was designed to investigate risks and resources that may impede or enhance the functioning of African American families. Data were collected in Iowa and Georgia, including various types of neighborhoods such as rural farm communities and suburban areas.

Participants

At Wave 1 of data collection, a total of 897 African American families were recruited for participation in the FACHS. Each participating family had an African American child approximately aged 11 years old (M = 10.6, SD = .56, ranged from 9 to 12 years of age). Forty-six percent (n = 417) of the participants were boys, 54 % (n = 480) were girls. Primary caregiver was defined as the person living in the same household as the target child with primary responsibility for his or her care. Most of the primary caregivers at Wave 1 were the children's biological mothers (84%) and biological fathers (6%). Other primary caregivers included grandmothers (5%), adoptive parents (2%), biological relatives (2%), stepparents (1%), and non-relatives (less than 1%). Ninety-three percent of the primary caregivers were female. The mean age of primary caregivers at Wave 1 was 37.10 years (SD = 8.18 years). The primary caregivers' educational levels ranged from less than high school (19%) to a graduate degree (3%), with a high school diploma as the mode (41%).

Two years later when these teenagers were on average 13 years old, the participants were re-contacted for the Wave 2 data collection. Of the 897 families who participated in the Wave 1 data collection, 777 (86.7%) participated in the Wave 2 data collection. Our analyses were based on the data of the participants who completed both waves. No difference was found between the continuing participants and those who left the study by Wave 2 in terms of the study variables measured at Wave 1 (i.e., stressful life events, youths' depressive symptoms, parents' engagement in inductive reasoning, and household gross income).

Sampling strategy

Because the central interest of the FACHS was to investigate the effects of neighborhood characteristics on family functioning and mental health, families from varying levels of neighborhood socioeconomic status were recruited. Block group areas (BGA) were selected in Iowa and Georgia with at least 10% African American residents that spanned a wide range of percentages of children below the poverty line. The total sample included families from 259 BGAs, 144 in Iowa and 115 in Georgia. Because the project was aimed at studying rural African American families and children, we avoided major cities in Georgia (e.g., Atlanta) and focused on suburban areas, small towns, and rural communities. In Iowa, only two communities had BGAs that met criteria for a high enough percentage of African American residents. These were cities with populations from 65,000 to 150,000. Therefore, all the BGAs in Iowa were selected from these two cities. Within each BGA, households were randomly selected. The letters were sent to the selected families to inform about the study. Following the letters, research staff visited families, explaining the study procedures. The Georgia and Iowa samples were combined after we confirmed that they were

comparable on demographic characteristics (Cutrona et al., 2000). The combined data has been used in previous studies (e.g., Brody et al., 2001, 2003; Cutrona et al., 2000, 2005; Ge et al., 2002; Simons et al., 2002). We conducted a set of preliminary analyses to examine whether the results in this study differed from participants who resided in Iowa and Georgia. State of residence was not a significant predictor of depressive symptoms at age 13, nor did it interact with any of the other predictor variables. Therefore, state of residence was not included in the subsequent analyses.

Procedure

A pilot study of the instruments was conducted before data collection began. Focus groups, which were composed of African American women who lived in neighborhoods similar to those in the study, critiqued the instruments. Researchers modified the instruments by incorporating the suggestions made by the focus groups. To facilitate cultural understanding and rapport, African American university students and community members served as interviewers for data collection. Two two-hour interviews at home were conducted for each wave of data collection. Each interview was conducted individually, without other members of family present. The instruments were presented on laptop computers. Questions appeared in sequence on the screen. The interviewers read each question aloud and entered the participant's response with the computer keypad.

Creating neighborhood clusters

As mentioned earlier, the unique aspect of the FACHS data is that the families in this study were nested within neighborhoods, i.e., BGAs. Raudenbush and Bryk (2002) recommended that in multilevel analysis where participants were nested within a group (e.g., BGA), it is essential to have sufficient (>15) subjects per group. In this data, however, only seven of the 259 BGAs contained 15 or more families. This limited number per BGA presents challenge for multilevel modeling using BGA as a level-2 unit.

In order to solve this problem, this project created neighborhood clusters (see Cutrona et al., 2000). A series of cluster analyses were performed on five key census variables (i.e., average per capita income, proportion of female-headed households, proportion of persons on public assistance, proportion of households below the poverty line, and proportion of unemployed men). These analyses identified clusters of BGAs that were geographically proximal and maximally similar in their neighborhood social economic characteristics. Thus, neighborhood clusters in this study refer to the aggregation of small BGAs whose locations and social economic circumstances were very similar. Twenty-one clusters in Iowa and 20 in Georgia were identified. The current analyses used these neighborhood clusters as a level-2 unit. The number of study families in a cluster ranged from 4 to 56, although the vast majority (76%) of clusters contained 15–30 families.

These clusters varied substantially regarding the levels of economic disadvantage. Across our neighborhood clusters, the average proportion of persons living below the poverty line was 25%, with 32% of all clusters located in high poverty areas (i.e., 30% or more of the residing families in a cluster lived below the poverty line). Average per capita income in our neighborhoods was $13,190, with a range of $7,332 to $70,147. Unemployment in neighborhoods varied from 30% to 76 %, with an average of 30%. The proportion of single parents was between 2.9% to 57%, with a mean of 19%.

Deviant and criminal behaviors were relatively ubiquitous in many of our neighborhood clusters. More than half (55%) of the target children reported that in the past six months, there were violent arguments in their neighborhoods, 31% stated that there were robberies, 16% indicated that there were sexual assaults or rapes, 17% stated that there were murders,

22% reported that there were gang fights, and 35% reported that they had seen fights with weapons in their neighborhoods. Thirty-five percent of the target youths thought that public drinking was a problem in their neighborhoods, and 39% indicated drug sale and use were community problems.

Measures

Demographic characteristics—Age, household income, and gender were included in the current analyses for the following reasons. It was necessary to control for the effect of age at the Wave 1 assessment because there was variation in the age of the participating youths. Although the majority of youths were 10 or 11 years old (46.1%, 47.9%, respectively) during the administration of the first data collection, a small number of youths were 9 or 12 years old (1.4%, 4.6%, respectively). Household income was also an important covariate because poor families are likely to reside in disadvantaged neighborhoods, confounding neighborhood effect with family economic conditions (Mayer & Jencks, 1989). Gender of the child was also included in the analyses because the existing evidence suggests that boys and girls tend to show different rates of change in depressive symptoms (Ge, Lorenz et al., 1994; Hankin et al, 1998; Wichstrom, 1999). Youths reported their age and gender at the Wave 1 assessment. Primary caregivers provided the information regarding household income at the first home visit of the Wave 1 data collection.

Youth's depressive symptoms at the ages of 11 and 13—The Diagnostic Interview Schedule for Children, Version IV (DISC-IV; Shaffer et al., 1993), was used to assess the youth's depressive symptoms. The DISC-IV has demonstrated reliability and validity (Shaffer et al., 1993). During the interview, children were asked to respond to 20 questions about their mood during the preceding year using a 3-point scale (*0 = no, 1 = sometimes, 2 = yes*). The responses to 20 items were then summed to create the depressive symptom counts.

Stressful life events at age 11—Stressful life events were assessed at Wave 1 using the Junior High Life Experiences Survey (JHLES) developed by Swearingen and Cohen (1985a). The JHLES has demonstrated validity and has been used in other studies (e.g., Swearingen and Cohen, 1985b). Using a dichotomous scale of *yes* (1) or *no* (0), adolescents were asked 47 items to indicate whether each of the listed events (e.g., parental divorce, death and illness of friends and family, break up with boy/girlfriend, family problems, trouble at school) occurred during the past 12 months. The number of yesanswers was counted to compute the frequency of stressful life event experiences. The possible score range of the JHLES spanned from 0 to 47.

Primary caregiver's engagement in inductive reasoning—The 7-item inductive reasoning scale measured the frequency of primary caregivers' engagement in parenting behavior that induces adolescents' own thinking by parents providing reasons for their behavior toward children ($\alpha = .81$). Example items are: *How often does your primary caregiver give reasons for his or her decision? How often does your primary caregiver discipline you by reasoning, explaining, or talking to you? How often does your primary caregiver ask you what you think before making a decision about you?* The youths used a 4-point scale, from *never* (1) to *always* (4) to indicate their response. We summed the responses and created a scale of primary caregivers' engagement in inductive reasoning, which ranged from 4 to 28.

Neighborhood disorder at age 11—Most of the research on neighborhood effects relied on census data, either at tract or BGA level. Census data provide important structural information such as percentage of families in poverty in a geographically defined area. Data

from the census, however, provide only limited information about social and physical disorders (Burton, Price-Spratlen, & Spender, 1996; Sampson, Morenoff, & Gannon-Rowley, 2002; Sampson & Raudenbush, 1999), which were the foci of this study. In order to capture social and physical incivilities in neighborhoods, we used interviewers' observational ratings of neighborhood disorder.

When visiting the participant families, interviewers rated neighborhoods on several dimensions such as physical appearance, social interaction, and the presence of danger. This procedure is similar to the systematic social observation technique suggested by Sampson and Raudenbush (1999) in that trained observers visited the target neighborhoods and assessed the atmosphere, sights, and sounds of the neighborhoods. Two interviewers observed the neighborhood conditions, but we only used the observations reported by the primary interviewers. The secondary interviewers' observation was used to calculate inter-rater reliability ($\alpha = .62$), which indicated good agreement, according to the guidelines for evaluating the inter-rater reliability coefficients (Cicchetti, 1994; Landis & Koch, 1977). Eight items, which were developed for this study, were used to measure interviewers' perceptions of participants' neighborhoods ($\alpha = .63$). Example items included: *Is there graffiti on buildings, signs, or walls? Are there people engaging in illegal activities such as prostitution or selling drug? Are teenagers arguing, fighting, and acting hostile or threatening?* The primary interviewers rated their responses on a dichotomous scale, *yes* (1) or *no* (0). The responses were summed to create a summary score for the interviewer's observation of neighborhood disorder. The range of the scale was from 0 to 8. The summary scores were then averaged within each neighborhood cluster. This aggregation procedure allowed a creation of a level-2 variable that characterized each neighborhood cluster. Higher scores indicated higher degrees of neighborhood disorder.

Results

Table 1 provides the descriptive statistics. We first examined changes in depressive symptoms between ages 11 and 13. As shown in Table 1, adolescents reported more depressive symptoms when they were 13 years old ($M = 6.52$, $SD = 4.58$) than when they were 11 years old ($M = 6.04$, $SD = 4.75$), $t(896) = -9.77$, $p < .01$. There was no gender difference in the mean level of depressive symptoms at the age of 11 ($M = 6.11$, $SD = 4.83$ for girls; $M = 5.97$, $SD = 4.67$ for boys), $t(876) = -.413$, n.s. At age 13, girls had higher levels of depressive symptoms than boys ($M = 6.85$, $SD = 4.64$ for girls; $M = 6.15$, $SD = 4.49$ for boys), $t(775) = -2.13$, $p <. 05$.

Table 2 presents the correlations among the study variables. The correlations indicated modest stability of depressive symptoms over two years between the ages of 11 and 13 ($r = .31$, $p < .01$). Stressful life events experienced at age 11 were significantly related to depressive symptoms at age 11 ($r = .37$, $p < .01$) and to depressive symptoms at age 13 ($r = .26$, $p < .01$). Primary caregivers' engagement in inductive reasoning was significantly related to depressive symptoms at age 11 ($r = -.09$, $p < .01$) and at age 13 ($r = -.07$, $p < .05$).

Family household income was negatively related to neighborhood disorder ($r = -.26$, $p < .01$) and stressful life events ($r = -.10$, $p < .01$), indicating that families with lower household income tended to live in highly disordered neighborhoods, and that they were likely to encounter more stressful life events than those with higher income. The significant correlation suggested the necessity of statistical control for possible selection effects in estimating neighborhood effects. Therefore, in the following analyses, we included household income as a covariate. Neighborhood disorder was also positively related to stressful life events ($r = .15$, $p < .01$), suggesting that youths living in a disordered neighborhood where graffiti, gang activities, and illegal behaviors were more prevalent on

the street were more likely to encounter stressful life events. Neighborhood disorder measured at age 11 was modestly related to depressive symptoms at both ages 11 ($r = .06$, $p < .10$) and 13 ($r = .07$, $p < .05$), although the magnitudes of correlation were small.

Multilevel modeling: predicting changes in depressive symptoms

A series of multilevel modeling analyses was performed using SAS PROC MIXED (Littell, Milliken, Stroups, & Wolfinger, 1996; Singer, 1998) to examine the effects of neighborhood disorder, primary caregivers' engagement in inductive reasoning, and stressful life events, all of which were measured at age 11, on subsequent depressive symptoms at age 13. In estimating these effects, we included demographic variables and baseline depressive symptoms at age 11 as control variables. All the continuous predictors were centered at the means for the following analyses. Table 3 presents the estimated parameters for the four models. In these analyses, the parameter estimates are analogous to unstandardized coefficients typically reported in multiple regression analyses, which indicate increases or decreases in depressive symptoms with a unit increase of the independent variables. All the coefficients reported in Table 3 were estimated with maximum-likelihood estimation procedure.

Model 1 is an unconditional means model that estimates the variance components. According to this baseline model, the variance component of neighborhood cluster was very small ($\sigma_{ui} = 0.27$, n.s.) while the variance component of residual σ_{ei} was 20.78, $p < .01$. This model also generates an intraclass correlation of .01, suggesting that a very small portion of the variance was explained by the cluster of neighborhoods. Although some guidelines of multilevel modeling techniques suggest using ordinary least square regression when finding intraclass correlation as low as the one we found in this study (e.g., Snijder & Bosker, 1999), we decided to perform multilevel modeling for four reasons. First, the validity of the significance testing of variance components needs to be handled with caution because it assumes a large sample size of the level-2 unit (Singer, 1998). Maas and Hox (2004) recently pointed out that a small sample size at level 2 (50 or less), which is the case in the current study, may lead to biased estimates of the level-2 standard errors. Second, small variance components at the neighborhood level have been observed in previous studies using multilevel modeling techniques (Ross, 2000). Third, the weak intraclass correlation was conceivable given that there was a temporal gap (i.e., 2 years) between the time of assessment of neighborhood disorder and youths' depressive symptoms. Finally, it is well known that the effects of neighborhood tend to be small due to small variation, but it does not mean that neighborhood is irrelevant to development (Duncan & Raudenbush, 1999). Based on these reasons, we pursued the investigation using a multilevel modeling approach.

Model 2 is an analysis of covariance (ANCOVA) model that tests the main longitudinal effect of neighborhood disorder, with demographic variables and depressive symptoms at age 11 controlled. Although, as shown in Table 2, zero-order correlation between neighborhood disorder measured at age 11 and depressive symptoms at age 13 were weakly but significantly correlated, neighborhood disorder was no longer associated with depressive symptoms at age 13 after demographic variables (i.e., gender, age, household income) and depressive symptoms at age 11 were statistically controlled. Depressive symptoms at ages 11 and 13 were positively associated ($\beta = .30$, $p < .01$), indicating a modest stability of depressive symptoms over a two-year span. Although age and household income were not significantly related to youths' depressive symptoms, we decided to keep these variables as controls in our subsequent analyses due to the conceptual concerns mentioned earlier. The comparison of deviance statistics between Model 1 and 2 yielded a significant difference, ($\chi^2(5) = 204.7$, $p < .01$), indicating a significant improvement of Model 2 over Model 1. Following the guidelines suggested by Snijders and Bosker (1994, 1999), we estimated the

proportional reduction of the prediction error. The proportional reduction in mean squared prediction error between Model 1 and 2 was 9% and 7%for level-1 and level-2, respectively.

Model 3 was designed to test whether stressful life events and primary caregivers' use of inductive reasoning, both of which were measured at age 11, were prospectively associated with depressive symptoms two years later. In this model, gender was a significant predictor of subsequent depressive symptoms ($\beta = .66$, $p < .05$), indicating girls' higher levels of depressive symptoms at age 13 than that of boys. Stressful life events were positively related to depressive symptoms two years later ($\beta = .15$, $p < .01$). The main longitudinal effect of primary caregivers' use of inductive reasoning, however, was not significantly associated with depressive symptoms at age 13. Deviance statistics showed a significant improvement from Model 2 to 3, $\chi^2(2) = 23.1$, $p < .01$. The proportional reductions of the residual variance from Model 2 to 3 were 5% and 4% for level-1 and level-2, respectively.

Finally, in Model 4, the interaction terms between neighborhood disorder and two level-1 predictors (i.e., stressful life events and primary caregivers' use of inductive reasoning) were introduced into the equation. A comparison of deviance statistics showed that the fit of Model 4 was significantly better than that of Model 3 ($\chi^2(2) = 6.2$, $p < .05$), but the proportional reduction of the residual variance was small (2% and 3% for level-1 and 2, respectively). A comparison between Model 1 and 4 indicated that the prediction error was reduced by 14 % for level-1 and 12% for level-2 in Model 4. In this model, the effects of gender ($\beta = .64$, $p < .05$), depressive symptoms at age 11 ($\beta = .23$, $p < .01$) and stressful life events at age 11 ($\beta = .16$, $p < .01$) remained statistically significant. Neither the main effect of primary caregivers' use of inductive reasoning, nor the main effect of neighborhood disorder, nor the interaction between neighborhood disorder and stressful life events was a significant predictor of depressive symptoms at age 13. However, an interaction between neighborhood disorder and primary caregivers' use of inductive reasoning was found to be statistically significant. The coefficient was negative ($\beta = -.14$, $p < .05$), indicating that the protective effects of primary caregivers' inductive reasoning on subsequent depressive symptoms was significantly stronger for teenagers living in a more disordered neighborhood than those who lived in a less disordered neighborhood.

To illustrate this interaction effect, we plotted the slopes of regression of depressive symptoms on primary caregivers' use of inductive reasoning at the high, mean, and low levels of neighborhood disorder. Following Aiken and West (1991), we substituted the three values of neighborhood disorder (high = 1 SD above the mean, average = the mean, and low = 1 SD below the mean) into the regression equation. This procedure generated three simple regression equations that were shown in Fig. 1. As shown in Fig. 1, there was little association between the levels of depressive symptoms at age 13 and primary caregivers' use of inductive reasoning at age 11 among adolescents living in low levels of neighborhood disorder. However, children living in highly disordered neighborhoods were more likely to report fewer symptoms of depressive symptoms two years later if their parents had engaged in discipline using inductive reasoning at age 11. Although the magnitude of coefficients was small, the unstandardized regression slope for primary caregivers' use of inductive reasoning was negative and stepper for those living in more disordered neighborhoods (−.20) than for those living in average (−.09) or in less disordered neighborhoods (.02). These results indicate that the protective effect of primary caregivers' engagement in inductive reasoning was more pronounced for children living in more disordered neighborhoods than for those living in less disordered neighborhoods.

Discussion

The present study examined changes in depressive symptoms during early adolescence by investigating several contextual antecedents, including neighborhood disorder, parenting, and stressful life events. Although depressive symptoms generally increase during adolescence, significant variation exists: some youths experience a sharp increase while others undergo a gradual elevation or no increase at all. Using a prospective design and longitudinal data from a large sample of African American families, this study attempted to shed new light on the question: how do neighborhood disorder, stressful life events, and parenting at the beginning of early adolescence contribute to subsequent depressive symptoms by the end of early adolescence?

Several important findings emerged from this study. Consistent with our prediction, stressful life events experienced by children at age 11 indeed exerted significant effects on depressive symptoms at age 13. This longitudinal effect remained significant even after we adjusted for the initial level of depressive symptoms. Converging with prior findings regarding longitudinal effects of stressful life events on adolescents' depressive symptoms (Compas et al., 1989; Windle, 1992), this finding suggests that adolescents who experience frequent exposure to stressful life events are at risk of experiencing sharper increases in depressive symptoms during early adolescence. In keeping with the reports regarding a significant contribution of stressful life events on changes in depressive symptoms in other racial/ethnic populations (e.g., Ge, Lorenz, et al., 1994; Ge, Natsuaki, & Conger, 2006; Larson & Ham, 1993; Windle, 1992), the current finding, based on a large sample of African American adolescents, provides evidence for the generalizability across racial/ethnic groups that stressful life events are an important proximal factor for increases in depressive symptoms in early adolescence.

We did not find the main effect of neighborhood disorder on depressive symptoms two years later after controlling for demographic variables and baseline levels of depressive symptoms measured at age 11. Although neighborhood disorder had an expected significant zero-order correlation with depressive symptoms at age 13, this coefficient was reduced to non-significant when other variables (i.e., demographic variables and depressive symptoms at age 11) were included in the multilevel analysis. It is important to note, however, that several cross-sectional and longitudinal studies did report significant direct effects of neighborhood disorder on depressive symptoms. For instance, neighborhood disorder significantly predicted depression nine months later in Latkin and Curry's study (2003), even after controlling for baseline levels of depression. Ross (2000) and Cutrona et al. (2000) both found concurrent main effects of neighborhoods on depressive symptoms. The fact that we did not find any direct neighborhood effect on depressive symptoms may be due to the difference in sources of information: these studies used adult self-perceived neighborhood disorders whereas this study used observational rating of neighborhoods by our interviewers. Indeed, the census data on community disadvantages were not directly related to depressive symptoms in some studies (Cutrona et al., 2000; Ross, 2000). The difference between the study by Latkin and Curry (2003) and this study in the prospective effect of neighborhood disorder may also be due to the difference in time intervals. That is, Latkin and Curry (2003) followed the participants for nine months, whereas this study had a time lag of 2 years.

We did not find any significant interaction effect between neighborhood disorder and stressful life events. This is contrary to our expectation. A possible explanation of the non-significant interaction between neighborhood disorder and stressful life events is that, because stressful life events are likely to occur more frequently in highly disordered neighborhoods (Allison et al., 1999; Pearlin, 1989), the overlap between the two factors

makes it difficult to detect a statistical interaction. The relationship between neighborhood disorder and stressful life events may also be more complex than a simple interaction. For instance, it may well be that while some residents in highly disordered neighborhoods who undergo increased stressful life events may experience eroded emotional well-being, others may become oblivious or less sensitive to stressful life events, still others may develop more effective ways to cope with overwhelming stressors in such neighborhoods (Compas, 1987). Future research efforts are needed to scrutinize the nature of the relationship between neighborhood disorder and stressful life events.

Although primary caregivers' engagement in inductive reasoning was not a significant predictor of depressive symptoms at age 13, our results showed a significant interaction between neighborhood disorder and primary caregivers' inductive reasoning. This finding indicates that having a parent who uses inductive reasoning as a way of coaching children is especially beneficial for children who live in a highly disordered neighborhood. In highly disordered neighborhoods where incivility and deviance were prevalent on the street, residents tend to feel threatened and powerless because they perceive their lives being shaped by unknown forces and misfortunes beyond their control (Ross et al., 2001). In such environments where uncertainty is overwhelming, parental behaviors such as providing reasoned explanations of what is going on and encouraging children to think could foster children's ability to evaluate the situation, which may help overcome a sense of powerlessness, anxiety, and despair. This finding not only converges with findings reported by Dearing (2004), but also augments the previous findings based on its different sample and methods: This study demonstrated evidence for an interaction between neighborhood disorder and parenting interaction by using the interviewers' observational rating of neighborhood disorder, as opposed to crime levels and median income at census tract level. Furthermore, this study used suburban and rural communities, whereas the other studies have collected the data mainly from inner city samples (e.g., Dearing, 2004).

By examining multiple contextual effects at several levels, this study underscores the importance of an ecological approach to investigating contextual factors in depressive symptoms. Our findings suggest that a fuller understanding of adolescent depressive symptoms will entail research attention to not only multiple layers of contexts (e.g., neighborhood, family, and individual life experiences), but also the interplay of these factors in identifying conditions under which depressive phenomena occur. Our findings that individuals' experiences, such as stressful life events, and the interaction between neighborhood contexts and family processes in early adolescence matter for later adolescent depressive symptoms signify the need to address adolescent depressive symptoms from such a contextual and developmental perspective (Bronfenbrenner, 1986).

Implications

Overall, these findings point to the importance of neighborhood-based services and initiative to improve the emotional well-being of adolescents. Such services could focus on providing the personal and social resources to cope with stressful life events, and encouraging parents living in highly disordered neighborhoods to use inductive reasoning as a way to discipline children. For example, teaching parents in disordered neighborhoods how to give reasons and explanations for their actions to children and how to listen to children's opinions may be readily incorporated in the existing parenting classes. Such a practice may help prevent child and adolescent psychological distress, especially those living in disordered neighborhoods. It is important, however, to remind readers that the magnitude of the effects of our study variables, particularly the interaction between neighborhood disorder and primary caregivers' engagement in inductive reasoning, was rather small. This small magnitude should be expected because the mechanisms underlying the development of depressive symptoms are rather complex, likely involving interactions of multiple factors (Ahadi &

Diener, 1989). Although focusing solely on reducing neighborhood disorder and stressful life events, and increasing parenting effectiveness is not expected to substantially improve emotional well-being of adolescents overnight, it appears that adolescents and families could benefit significantly from a neighborhood-based intervention that adds some aspects of the current findings.

Limitations

Several caveats of the study must be noted. First, we created neighborhood clusters by aggregating BGAs with similar census characteristics. This procedure might have combined BGAs with similar census characteristics that were not geographically contiguous. Second, though some of our most salient findings involved neighborhood disorder, it should be noted that our measure of neighborhood disorder is an aggregation of the interviewers' observation of neighborhood conditions by each cluster. Third, because the FACHS was designed to examine the functions of African American families, we did not have access to other racial/ethnic groups for comparison purposes. Therefore, it is not known whether the present results can be generalized to families of other ethnicities. Future studies are needed to examine different ethnic groups. Fourth, although we kept household income, an important covariate, in our models to control for selection effects, it is difficult to know whether characteristics of parents other than household income might have played a role in youngsters' depressive symptoms. This is especially important because researchers studying neighborhood effects have noted that selection effects could cause an over- or underestimation of the neighborhood effects (Caspi, Taylor, Moffitt, & Plomin, 2000; Duncan & Raudenbush, 1999). Finally, the effect sizes, as represented by the proportional reduction of prediction error (Snijders & Bosker, 1999), were small.

Despite these noted limitations, this study converges with an increasing number of studies to show that the interplay of multiple contexts surrounding adolescents' lives indeed exerts a significant negative impact on early adolescents' emotional development. In early adolescence, important changes in biological, cognitive, and social dimensions of development often lead to an increase in depressive symptoms. The present study attempted to answer the question of why depressive symptoms increase more in some adolescents than in others. The finding that neighborhood disorder, stressful life events, and parenting in early adolescence exert influences on later depressive symptoms among African American youths represents an important addition to the literature.

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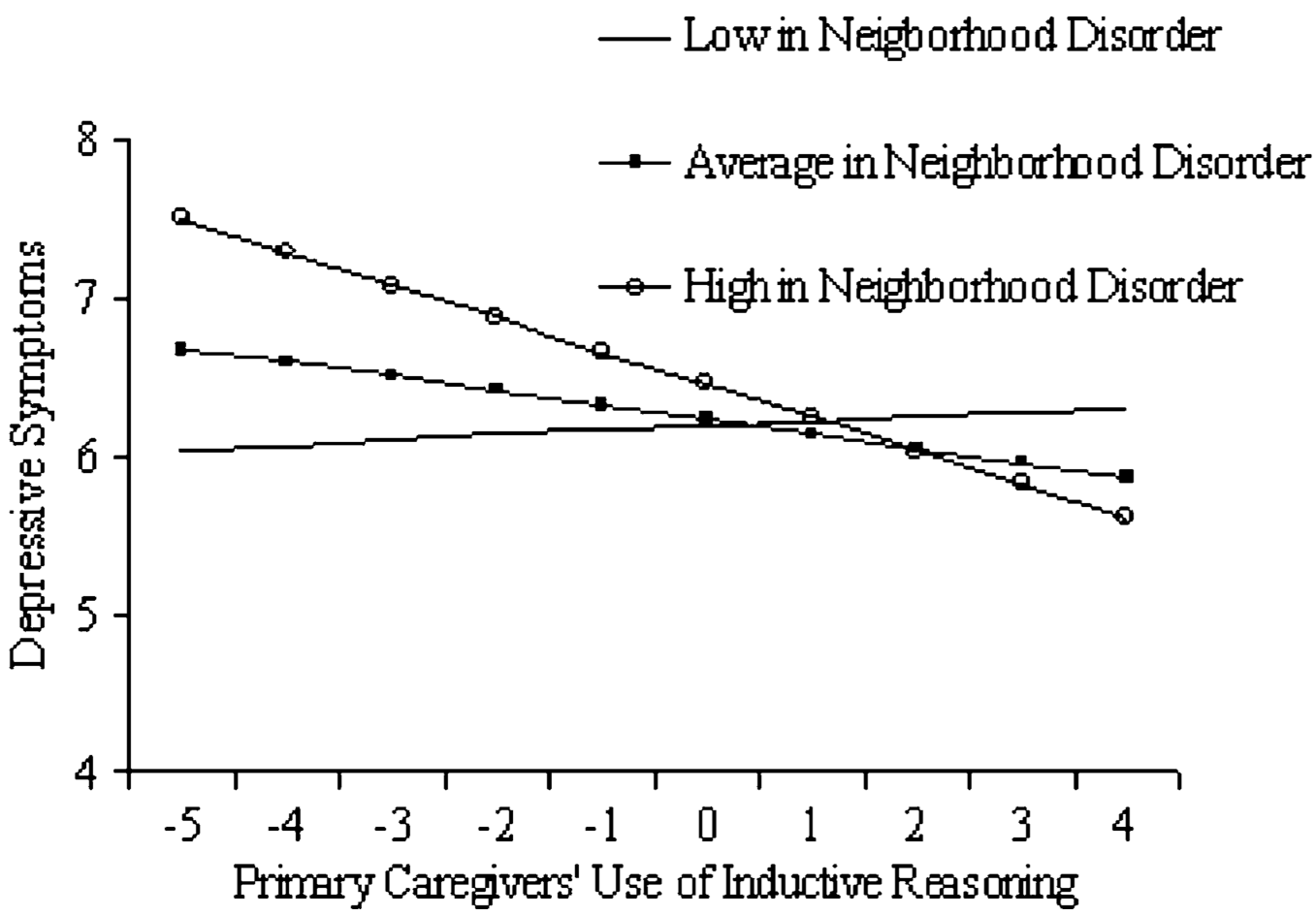

Fig. 1.
The regression slopes of depressive symptoms at age 13 on primary caregivers' engagement in inductive reasoning at high, average, and low levels of neighborhood disorder

Table 1

Means and standard deviations of the study variables

Variables	Mean	*SD*
Depressive symptoms$_{\text{at age 11}}$	6.04	4.75
Depressive symptoms$_{\text{at age 13}}$	6.52	4.58
Stressful life events$_{\text{at age 11}}$	9.07	5.45
Primary caregiver's inductive reasoning$_{\text{at age 11}}$	24.13	2.46
Neighborhood disorder$_{\text{at age 11}}$	3.27	0.88

Table 2

Intercorrelations of the study variables

	1	2	3	4	5	6	7
Age	—						
Household income	0.01	—					
Depressive symptoms$_{\text{at age 11}}$	0.02	−0.02	—				
Depressive symptoms$_{\text{at age 13}}$	0.01	0.02	0.31**	—			
Stressful life events$_{\text{at age 11}}$	0.14**	−0.10**	0.37**	0.26**	—		
Primary caregiver's inductive reasoning$_{\text{at age 11}}$	−0.07	−0.06	−0.09**	−0.07*	−0.04	—	
Neighborhood disorder$_{\text{at age 11}}$	0.03	−0.26**	0.06***	0.07*	0.15**	0.02	—

Note:

* $p<0.05$,

** $p<0.01$,

*** $p<0.10$

Table 3

Mixed model coefficients on depressive symptoms at age 13

		Model 1	Model 2	Model 3	Model 4
Level 1					
Intercept	β_{0i}	6.54**	6.25**	6.27**	6.32**
	SE	(0.18)	(0.28)	(0.27)	(0.27)
Gender[a]	β_1	—	0.59***	0.66*	0.64
	SE		(0.32)	(0.32)	(0.32)
Age	β_2	—	0.02	−0.08	−0.08
	SE		(0.27)	(0.26)	(0.26)
Household income	β_3	—	<0.01	<0.01	<0.01
	SE		(<0.01)	(<0.01)	(<0.01)
Depressive symptoms$_{\text{at age 11}}$	β_4	—	0.30**	0.23**	0.23**
	SE		(0.03)	(0.04)	(0.04)
Stressful life events$_{\text{at age 11}}$	β_5	—	—	0.15**	0.16**
	SE			(0.03)	(0.03)
Primary caregiver's inductive reasoning$_{\text{at age 11}}$	β_6	—	—	−0.09	−0.09
	SE			(0.07)	(0.07)
Level 2					
Observed neighborhood disorder$_{\text{at age 11}}$	γ_{01}	—	0.27	0.18	0.15
	SE		(0.19)	(0.19)	(0.19)
Cross-level interactions					
Stressful life events × observed neighborhood disorder	γ_{11}	—	—	—	−0.05
	SE				(0.03)
Inductive reasoning × observed neighborhood disorder	γ_{21}	—	—	—	−0.14*
	SE				(0.07)
Deviance		4,440.5	4,235.8	4,212.7	4,206.5

Note.

[a]Boys = 0, Girls = 1,

*$p < .05$,

** $p < .01$,

*** $p < .10$